

RAW SEQUENCE LISTING

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) no errors detected.

Application Serial Number: 09/937,779B
Source: 1FW/b
Date Processed by STIC: 6/13/06

ENTERED



IFW16

RAW SEQUENCE LISTING

DATE: 06/13/2006

PATENT APPLICATION: US/09/937,779B

TIME: 09:45:31

Input Set : A:\00930003.APP

Output Set: N:\CRF4\06132006\I937779B.raw

3 <110> APPLICANT: DAHLQVIST, ANDERS
 4 STAHL, ULF
 5 LENMAN, MARIT
 6 BANAS, ANTONI
 7 RONNE, HANS
 8 STYMNE, STEN
 10 <120> TITLE OF INVENTION: PROCESSES FOR PRODUCING TRIACYLGLYCEROL USING GENES
 11 THAT ENCODE PHOSPHOLIPID:DIACYLGLYCEROL
 12 ACYLTRANSFERASES
 14 <130> FILE REFERENCE: 0093/000003
 16 <140> CURRENT APPLICATION NUMBER: 09/937,779B
 17 <141> CURRENT FILING DATE: 2002-07-02
 19 <150> PRIOR APPLICATION NUMBER: PCT/EP00/002701
 20 <151> PRIOR FILING DATE: 2000-03-28
 22 <150> PRIOR APPLICATION NUMBER: 60/180,687
 23 <151> PRIOR FILING DATE: 2000-02-07
 25 <150> PRIOR APPLICATION NUMBER: EP 99111321.8
 26 <151> PRIOR FILING DATE: 1999-06-10
 28 <150> PRIOR APPLICATION NUMBER: EP 99106656.4
 29 <151> PRIOR FILING DATE: 1999-04-01
 31 <160> NUMBER OF SEQ ID NOS: 35
 33 <170> SOFTWARE: PatentIn Ver. 3.3
 35 <210> SEQ ID NO: 1
 36 <211> LENGTH: 1986
 37 <212> TYPE: DNA
 38 <213> ORGANISM: Saccharomyces cerevisiae
 40 <220> FEATURE:
 41 <221> NAME/KEY: CDS
 42 <222> LOCATION: (1)..(1983)
 44 <400> SEQUENCE: 1
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 46 Met Gly Thr Leu Phe Arg Arg Asn Val Gln Asn Gln Lys Ser Asp Ser
 47 1 5 10 15
 49 gat gaa aac aat aaa ggg ggt tct gtt cat aac aag cga gag agc aga 96
 50 Asp Glu Asn Asn Lys Gly Gly Ser Val His Asn Lys Arg Glu Ser Arg
 51 20 25 30
 53 aac cac att cat cat caa cag gga tta ggc cat aag aga aga agg ggt 144
 54 Asn His Ile His His Gln Gln Gly Leu Gly His Lys Arg Arg Arg Gly
 55 35 40 45
 57 att agt ggc agt gca aaa aga aat gag cgt ggc aaa gat ttc gac agg 192
 58 Ile Ser Gly Ser Ala Lys Arg Asn Glu Arg Gly Lys Asp Phe Asp Arg
 59 50 55 60
 61 aaa aga gac ggg aac ggt aga aaa cgt tgg aga gat tcc aga aga ctg 240

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62 Lys Arg Asp Gly Asn Gly Arg Lys Arg Trp Arg Asp Ser Arg Arg Leu
63 65 70 75 80
65 att ttc att ctt ggt gca ttc tta ggt gta ctt ttg ccg ttt agc ttt 288
66 Ile Phe Ile Leu Gly Ala Phe Leu Gly Val Leu Leu Pro Phe Ser Phe
67 85 90 95
69 ggc gct tat cat gtt cat aat agc gat agc gac ttg ttt gac aac ttt 336
70 Gly Ala Tyr His Val His Asn Ser Asp Ser Asp Leu Phe Asp Asn Phe
71 100 105 110
73 gta aat ttt gat tca ctt aaa gtg tat ttg gat gat tgg aaa gat gtt 384
74 Val Asn Phe Asp Ser Leu Lys Val Tyr Leu Asp Asp Trp Lys Asp Val
75 115 120 125
77 ctc cca caa ggt ata agt tcg ttt att gat gat att cag gct ggt aac 432
78 Leu Pro Gln Gly Ile Ser Ser Phe Ile Asp Asp Ile Gln Ala Gly Asn
79 130 135 140
81 tac tcc aca tct tct tta gat gat ctc agt gaa aat ttt gcc gtt ggt 480
82 Tyr Ser Thr Ser Ser Leu Asp Asp Leu Ser Glu Asn Phe Ala Val Gly
83 145 150 155 160
85 aaa caa ctc tta cgt gat tat aat atc gag gcc aaa cat cct gtt gta 528
86 Lys Gln Leu Leu Arg Asp Tyr Asn Ile Glu Ala Lys His Pro Val Val
87 165 170 175
89 atg gtt cct ggt gtc att tct acg gga att gaa agc tgg gga gtt att 576
90 Met Val Pro Gly Val Ile Ser Thr Gly Ile Glu Ser Trp Gly Val Ile
91 180 185 190
93 gga gac gat gag tgc gat agt tct gcg cat ttt cgt aaa cgg ctg tgg 624
94 Gly Asp Asp Glu Cys Asp Ser Ser Ala His Phe Arg Lys Arg Leu Trp
95 195 200 205
97 gga agt ttt tac atg ctg aga aca atg gtt atg gat aaa gtt tgt tgg 672
98 Gly Ser Phe Tyr Met Leu Arg Thr Met Val Met Asp Lys Val Cys Trp
99 210 215 220
101 ttg aaa cat gta atg tta gat cct gaa aca ggt ctg gac cca ccg aac 720
102 Leu Lys His Val Met Leu Asp Pro Glu Thr Gly Leu Asp Pro Pro Asn
103 225 230 235 240
105 ttt acg cta cgt gca gca cag ggc ttc gaa tca act gat tat ttc atc 768
106 Phe Thr Leu Arg Ala Ala Gln Gly Phe Glu Ser Thr Asp Tyr Phe Ile
107 245 250 255
109 gca ggg tat tgg att tgg aac aaa gtt ttc caa aat ctg gga gta att 816
110 Ala Gly Tyr Trp Ile Trp Asn Lys Val Phe Gln Asn Leu Gly Val Ile
111 260 265 270
113 ggc tat gaa ccc aat aaa atg acg agt gct gcg tat gat tgg agg ctt 864
114 Gly Tyr Glu Pro Asn Lys Met Thr Ser Ala Ala Tyr Asp Trp Arg Leu
115 275 280 285
117 gca tat tta gat cta gaa aga cgc gat agg tac ttt acg aag cta aag 912
118 Ala Tyr Leu Asp Leu Glu Arg Arg Asp Arg Tyr Phe Thr Lys Leu Lys
119 290 295 300
121 gaa caa atc gaa ctg ttt cat caa ttg agt ggt gaa aaa gtt tgt tta 960
122 Glu Gln Ile Glu Leu Phe His Gln Leu Ser Gly Glu Lys Val Cys Leu
123 305 310 315 320
125 att gga cat tct atg ggt tct cag att atc ttt tac ttt atg aaa tgg 1008
126 Ile Gly His Ser Met Gly Ser Gln Ile Ile Phe Tyr Phe Met Lys Trp

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------|
| 127 | | | | 325 | | | | | 330 | | | | | 335 | | | | |
| 129 | gtc | gag | gct | gaa | ggc | cct | ctt | tac | ggt | aat | ggt | ggt | cgt | ggc | tgg | gtt | | 1056 |
| 130 | Val | Glu | Ala | Glu | Gly | Pro | Leu | Tyr | Gly | Asn | Gly | Gly | Arg | Gly | Trp | Val | | |
| 131 | | | | 340 | | | | | 345 | | | | | 350 | | | | |
| 133 | aac | gaa | cac | ata | gat | tca | ttc | att | aat | gca | gca | ggg | acg | ctt | ctg | ggc | | 1104 |
| 134 | Asn | Glu | His | Ile | Asp | Ser | Phe | Ile | Asn | Ala | Ala | Gly | Thr | Leu | Leu | Gly | | |
| 135 | | | | 355 | | | | | 360 | | | | | 365 | | | | |
| 137 | gct | cca | aag | gca | gtt | cca | gct | cta | att | agt | ggt | gaa | atg | aaa | gat | acc | | 1152 |
| 138 | Ala | Pro | Lys | Ala | Val | Pro | Ala | Leu | Ile | Ser | Gly | Glu | Met | Lys | Asp | Thr | | |
| 139 | | | | 370 | | | | | 375 | | | | | 380 | | | | |
| 141 | att | caa | tta | aat | acg | tta | gcc | atg | tat | ggt | ttg | gaa | aag | ttc | ttc | tca | | 1200 |
| 142 | Ile | Gln | Leu | Asn | Thr | Leu | Ala | Met | Tyr | Gly | Leu | Glu | Lys | Phe | Phe | Ser | | |
| 143 | 385 | | | | | | | | 390 | | | | | 395 | | | | 400 |
| 145 | aga | att | gag | aga | gta | aaa | atg | tta | caa | acg | tgg | ggt | ggt | ata | cca | tca | | 1248 |
| 146 | Arg | Ile | Glu | Arg | Val | Lys | Met | Leu | Gln | Thr | Trp | Gly | Gly | Ile | Pro | Ser | | |
| 147 | | | | 405 | | | | | 410 | | | | | 415 | | | | |
| 149 | atg | cta | cca | aag | gga | gaa | gag | gtc | att | tgg | ggg | gat | atg | aag | tca | tct | | 1296 |
| 150 | Met | Leu | Pro | Lys | Gly | Glu | Glu | Val | Ile | Trp | Gly | Asp | Met | Lys | Ser | Ser | | |
| 151 | | | | 420 | | | | | 425 | | | | | 430 | | | | |
| 153 | tca | gag | gat | gca | ttg | aat | aac | aac | act | gac | aca | tac | ggc | aat | ttc | att | | 1344 |
| 154 | Ser | Glu | Asp | Ala | Leu | Asn | Asn | Asn | Thr | Asp | Thr | Tyr | Gly | Asn | Phe | Ile | | |
| 155 | | | | 435 | | | | | 440 | | | | | 445 | | | | |
| 157 | cga | ttt | gaa | agg | aat | acg | agc | gat | gct | ttc | aac | aaa | aat | ttg | aca | atg | | 1392 |
| 158 | Arg | Phe | Glu | Arg | Asn | Thr | Ser | Asp | Ala | Phe | Asn | Lys | Asn | Leu | Thr | Met | | |
| 159 | | | | 450 | | | | | 455 | | | | | 460 | | | | |
| 161 | aaa | gac | gcc | att | aac | atg | aca | tta | tcg | ata | tca | cct | gaa | tgg | ctc | caa | | 1440 |
| 162 | Lys | Asp | Ala | Ile | Asn | Met | Thr | Leu | Ser | Ile | Ser | Pro | Glu | Trp | Leu | Gln | | |
| 163 | 465 | | | | | | | | 470 | | | | | 475 | | | | 480 |
| 165 | aga | aga | gta | cat | gag | cag | tac | tcg | ttc | ggc | tat | tcc | aag | aat | gaa | gaa | | 1488 |
| 166 | Arg | Arg | Val | His | Glu | Gln | Tyr | Ser | Phe | Gly | Tyr | Ser | Lys | Asn | Glu | Glu | | |
| 167 | | | | 485 | | | | | 490 | | | | | 495 | | | | |
| 169 | gag | tta | aga | aaa | aat | gag | cta | cac | cac | aag | cac | tgg | tcg | aat | cca | atg | | 1536 |
| 170 | Glu | Leu | Arg | Lys | Asn | Glu | Leu | His | His | Lys | His | Trp | Ser | Asn | Pro | Met | | |
| 171 | | | | 500 | | | | | 505 | | | | | 510 | | | | |
| 173 | gaa | gta | cca | ctt | cca | gaa | gct | ccc | cac | atg | aaa | atc | tat | tgt | ata | tac | | 1584 |
| 174 | Glu | Val | Pro | Leu | Pro | Glu | Ala | Pro | His | Met | Lys | Ile | Tyr | Cys | Ile | Tyr | | |
| 175 | | | | 515 | | | | | 520 | | | | | 525 | | | | |
| 177 | ggg | gtg | aac | aac | cca | act | gaa | agg | gca | tat | gta | tat | aag | gaa | gag | gat | | 1632 |
| 178 | Gly | Val | Asn | Asn | Pro | Thr | Glu | Arg | Ala | Tyr | Val | Tyr | Lys | Glu | Glu | Asp | | |
| 179 | | | | 530 | | | | | 535 | | | | | 540 | | | | |
| 181 | gac | tcc | tct | gct | ctg | aat | ttg | acc | atc | gac | tac | gaa | agc | aag | caa | cct | | 1680 |
| 182 | Asp | Ser | Ser | Ala | Leu | Asn | Leu | Thr | Ile | Asp | Tyr | Glu | Ser | Lys | Gln | Pro | | |
| 183 | 545 | | | | | | | | 550 | | | | | 555 | | | | 560 |
| 185 | gta | ttc | ctc | acc | gag | ggg | gac | gga | acc | gtt | ccg | ctc | gtg | gcg | cat | tca | | 1728 |
| 186 | Val | Phe | Leu | Thr | Glu | Gly | Asp | Gly | Thr | Val | Pro | Leu | Val | Ala | His | Ser | | |
| 187 | | | | 565 | | | | | 570 | | | | | 575 | | | | |
| 189 | atg | tgt | cac | aaa | tgg | gcc | cag | ggt | gct | tca | ccg | tac | aac | cct | gcc | gga | | 1776 |
| 190 | Met | Cys | His | Lys | Trp | Ala | Gln | Gly | Ala | Ser | Pro | Tyr | Asn | Pro | Ala | Gly | | |
| 191 | | | | 580 | | | | | 585 | | | | | 590 | | | | |

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194 Ile Asn Val Thr Ile Val Glu Met Lys His Gln Pro Asp Arg Phe Asp
195          595          600          605
197 ata cgt ggt gga gca aaa agc gcc gaa cac gta gac atc ctc ggc agc 1872
198 Ile Arg Gly Gly Ala Lys Ser Ala Glu His Val Asp Ile Leu Gly Ser
199    610          615          620
201 gcg gag ttg aac gat tac atc ttg aaa att gca agc ggt aat ggc gat 1920
202 Ala Glu Leu Asn Asp Tyr Ile Leu Lys Ile Ala Ser Gly Asn Gly Asp
203 625          630          635          640
205 ctc gtc gag cca cgc caa ttg tct aat ttg agc cag tgg gtt tct cag 1968
206 Leu Val Glu Pro Arg Gln Leu Ser Asn Leu Ser Gln Trp Val Ser Gln
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209 atg ccc ttc cca atg taa 1986
210 Met Pro Phe Pro Met
211          660
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215 <211> LENGTH: 661
216 <212> TYPE: PRT
217 <213> ORGANISM: Saccharomyces cerevisiae
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220 Met Gly Thr Leu Phe Arg Arg Asn Val Gln Asn Gln Lys Ser Asp Ser
221    1          5          10          15
223 Asp Glu Asn Asn Lys Gly Gly Ser Val His Asn Lys Arg Glu Ser Arg
224          20          25          30
226 Asn His Ile His His Gln Gln Gly Leu Gly His Lys Arg Arg Arg Gly
227          35          40          45
229 Ile Ser Gly Ser Ala Lys Arg Asn Glu Arg Gly Lys Asp Phe Asp Arg
230          50          55          60
232 Lys Arg Asp Gly Asn Gly Arg Lys Arg Trp Arg Asp Ser Arg Arg Leu
233    65          70          75          80
235 Ile Phe Ile Leu Gly Ala Phe Leu Gly Val Leu Leu Pro Phe Ser Phe
236          85          90          95
238 Gly Ala Tyr His Val His Asn Ser Asp Ser Asp Leu Phe Asp Asn Phe
239          100          105          110
241 Val Asn Phe Asp Ser Leu Lys Val Tyr Leu Asp Asp Trp Lys Asp Val
242          115          120          125
244 Leu Pro Gln Gly Ile Ser Ser Phe Ile Asp Asp Ile Gln Ala Gly Asn
245          130          135          140
247 Tyr Ser Thr Ser Ser Leu Asp Asp Leu Ser Glu Asn Phe Ala Val Gly
248 145          150          155          160
250 Lys Gln Leu Leu Arg Asp Tyr Asn Ile Glu Ala Lys His Pro Val Val
251          165          170          175
253 Met Val Pro Gly Val Ile Ser Thr Gly Ile Glu Ser Trp Gly Val Ile
254          180          185          190
256 Gly Asp Asp Glu Cys Asp Ser Ser Ala His Phe Arg Lys Arg Leu Trp
257          195          200          205
259 Gly Ser Phe Tyr Met Leu Arg Thr Met Val Met Asp Lys Val Cys Trp
260          210          215          220
262 Leu Lys His Val Met Leu Asp Pro Glu Thr Gly Leu Asp Pro Pro Asn

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| 263 | 225 | | | | 230 | | | | 235 | | | | 240 | | | |
| 265 | Phe | Thr | Leu | Arg | Ala | Ala | Gln | Gly | Phe | Glu | Ser | Thr | Asp | Tyr | Phe | Ile |
| 266 | | | | | 245 | | | | 250 | | | | | | 255 | |
| 268 | Ala | Gly | Tyr | Trp | Ile | Trp | Asn | Lys | Val | Phe | Gln | Asn | Leu | Gly | Val | Ile |
| 269 | | | | 260 | | | | | 265 | | | | | 270 | | |
| 271 | Gly | Tyr | Glu | Pro | Asn | Lys | Met | Thr | Ser | Ala | Ala | Tyr | Asp | Trp | Arg | Leu |
| 272 | | | 275 | | | | | 280 | | | | | 285 | | | |
| 274 | Ala | Tyr | Leu | Asp | Leu | Glu | Arg | Arg | Asp | Arg | Tyr | Phe | Thr | Lys | Leu | Lys |
| 275 | | 290 | | | | | 295 | | | | | 300 | | | | |
| 277 | Glu | Gln | Ile | Glu | Leu | Phe | His | Gln | Leu | Ser | Gly | Glu | Lys | Val | Cys | Leu |
| 278 | 305 | | | | 310 | | | | | 315 | | | | | 320 | |
| 280 | Ile | Gly | His | Ser | Met | Gly | Ser | Gln | Ile | Ile | Phe | Tyr | Phe | Met | Lys | Trp |
| 281 | | | | | 325 | | | | | 330 | | | | | 335 | |
| 283 | Val | Glu | Ala | Glu | Gly | Pro | Leu | Tyr | Gly | Asn | Gly | Gly | Arg | Gly | Trp | Val |
| 284 | | | | 340 | | | | | 345 | | | | | 350 | | |
| 286 | Asn | Glu | His | Ile | Asp | Ser | Phe | Ile | Asn | Ala | Ala | Gly | Thr | Leu | Leu | Gly |
| 287 | | | 355 | | | | | 360 | | | | | 365 | | | |
| 289 | Ala | Pro | Lys | Ala | Val | Pro | Ala | Leu | Ile | Ser | Gly | Glu | Met | Lys | Asp | Thr |
| 290 | | 370 | | | | | 375 | | | | | 380 | | | | |
| 292 | Ile | Gln | Leu | Asn | Thr | Leu | Ala | Met | Tyr | Gly | Leu | Glu | Lys | Phe | Phe | Ser |
| 293 | 385 | | | | 390 | | | | | 395 | | | | | 400 | |
| 295 | Arg | Ile | Glu | Arg | Val | Lys | Met | Leu | Gln | Thr | Trp | Gly | Gly | Ile | Pro | Ser |
| 296 | | | | 405 | | | | | 410 | | | | | | 415 | |
| 298 | Met | Leu | Pro | Lys | Gly | Glu | Glu | Val | Ile | Trp | Gly | Asp | Met | Lys | Ser | Ser |
| 299 | | | 420 | | | | | 425 | | | | | 430 | | | |
| 301 | Ser | Glu | Asp | Ala | Leu | Asn | Asn | Asn | Thr | Asp | Thr | Tyr | Gly | Asn | Phe | Ile |
| 302 | | | 435 | | | | | 440 | | | | | 445 | | | |
| 304 | Arg | Phe | Glu | Arg | Asn | Thr | Ser | Asp | Ala | Phe | Asn | Lys | Asn | Leu | Thr | Met |
| 305 | | 450 | | | | | 455 | | | | | 460 | | | | |
| 307 | Lys | Asp | Ala | Ile | Asn | Met | Thr | Leu | Ser | Ile | Ser | Pro | Glu | Trp | Leu | Gln |
| 308 | 465 | | | | 470 | | | | | 475 | | | | | 480 | |
| 310 | Arg | Arg | Val | His | Glu | Gln | Tyr | Ser | Phe | Gly | Tyr | Ser | Lys | Asn | Glu | Glu |
| 311 | | | | 485 | | | | | 490 | | | | | | 495 | |
| 313 | Glu | Leu | Arg | Lys | Asn | Glu | Leu | His | His | Lys | His | Trp | Ser | Asn | Pro | Met |
| 314 | | | | 500 | | | | | 505 | | | | | 510 | | |
| 316 | Glu | Val | Pro | Leu | Pro | Glu | Ala | Pro | His | Met | Lys | Ile | Tyr | Cys | Ile | Tyr |
| 317 | | 515 | | | | | | 520 | | | | | 525 | | | |
| 319 | Gly | Val | Asn | Asn | Pro | Thr | Glu | Arg | Ala | Tyr | Val | Tyr | Lys | Glu | Glu | Asp |
| 320 | | 530 | | | | | 535 | | | | | 540 | | | | |
| 322 | Asp | Ser | Ser | Ala | Leu | Asn | Leu | Thr | Ile | Asp | Tyr | Glu | Ser | Lys | Gln | Pro |
| 323 | 545 | | | | 550 | | | | | 555 | | | | | 560 | |
| 325 | Val | Phe | Leu | Thr | Glu | Gly | Asp | Gly | Thr | Val | Pro | Leu | Val | Ala | His | Ser |
| 326 | | | | 565 | | | | | 570 | | | | | | 575 | |
| 328 | Met | Cys | His | Lys | Trp | Ala | Gln | Gly | Ala | Ser | Pro | Tyr | Asn | Pro | Ala | Gly |
| 329 | | | | 580 | | | | | 585 | | | | | 590 | | |
| 331 | Ile | Asn | Val | Thr | Ile | Val | Glu | Met | Lys | His | Gln | Pro | Asp | Arg | Phe | Asp |
| 332 | | 595 | | | | | 600 | | | | | | 605 | | | |
| 334 | Ile | Arg | Gly | Gly | Ala | Lys | Ser | Ala | Glu | His | Val | Asp | Ile | Leu | Gly | Ser |
| 335 | | 610 | | | | | 615 | | | | | 620 | | | | |

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Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:5; N Pos. 2363
Seq#:7; N Pos. 601,627
Seq#:9; N Pos. 15,45,83,103,107,112,210
Seq#:25; N Pos. 240,385
Seq#:25; Xaa Pos. 41,89
Seq#:26; N Pos. 601,627
Seq#:28; N Pos. 15,45,83,103,107,112,210
Seq#:32; Xaa Pos. 2
Seq#:35; Xaa Pos. 41,89

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L:515 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:2340
L:710 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7 after pos.:565
M:341 Repeated in SeqNo=7
L:788 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9 after pos.:0
M:341 Repeated in SeqNo=9
L:2328 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:25 after pos.:215
M:341 Repeated in SeqNo=25
L:2404 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:26 after pos.:565
M:341 Repeated in SeqNo=26
L:2482 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:28 after pos.:0
M:341 Repeated in SeqNo=28
L:2636 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:32 after pos.:0
L:2689 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:35 after pos.:32
M:341 Repeated in SeqNo=35